



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, WA 98101

September 27, 2005

MEMORANDUM

SUBJECT: Region 10 Response to National Remedy Review Board Recommendations for the Midnite Mine Superfund Site

FROM: Daniel D. Opalski, Director //S-Lori Cohen, Acting//
Office of Environmental Cleanup
Region 10

TO: Jo Ann Griffith, Chair
National Remedy Review Board
Office of Solid Waste and Emergency Response

EPA Region 10 (the Region) appreciated the opportunity to make a presentation to the National Remedy Review Board (Board) regarding the Midnite Mine Superfund Site (Site) on July 20, 2005. We hope that the following response fully addresses the Board's Advisory Recommendations as we move to the proposal of a cleanup plan.

1. The Board recognizes that there may be some issues related to several of the Tribal standards that could impact the remedy. The Board recommends that the Region continue to explore these issues and identify potential flexibilities that could affect the scope of the cleanup.

***Response:** The Region continues to meet with the Spokane Tribe (Tribe) to pursue flexibilities, particularly where they may affect the scope of the cleanup. In particular, EPA and the Tribe are discussing alternative water treatment system discharge levels and/or locations, the addition of limited mixing zone provisions to the Tribe's water quality ordinances, and phased implementation of water treatment system modifications, if necessary, after water conditions have stabilized following cleanup. The Region may invoke an interim ARAR waiver in this case. The issue, as well as the selection of a disposal location for water treatment system residuals, may be resolved through use of a contingency remedy approach. The Region seeks a solution that acknowledges the sovereignty of the Spokane Tribe while making decisions that are both protective and cost-effective. Additional detail is provided in the responses to Board comments Nos. 2, 3, and 7.*

2. Based on the package presented to the Board, water treatment to reduce sulfate to 250 parts per million (ppm) is being considered. Treatment to such low levels is both difficult and very costly, and it significantly increases the quantity of sludge for disposal. After completion of the actions to consolidate the mining waste materials, less sulfate may be generated. In that there

may be some uncertainty relative to the degree of sulfate treatment necessary, the Board recommends that the Region consider phasing the implementation of components of the treatment system to allow the benefits of the source control actions on sulfate levels to be evaluated. The Region may also want to explore the option of redirecting the discharge from the water treatment plant to a larger water body with more assimilation capacity, which would lessen the degree of sulfate treatment and the quantity of generated sludge and associated disposal costs.

Response: *The Region will continue to explore such options and understands that an alternative discharge location may be acceptable to the Tribe. Since this is only part of the solution, the Region anticipates that the remedy will include adaptive management and phasing of water treatment system modification, as recommended, to allow water quality to stabilize and assess the effect of source control on sulfate levels in water treatment system influent. Other options are also under consideration. The decision document will describe options and a decision process.*

3. The Board noted that costly off-site sludge disposal was being evaluated as an option. At other mining sites, water treatment sludge is typically disposed on-site to reduce disposal costs. The Board recommends that the Region continue to explore the possibility of on-site sludge disposal.

Response: *The Tribe's Hazardous Substances Control Act (HSCA), which as a matter of policy is a potential ARAR, would rule out on-site disposal of water treatment residuals as they are currently generated. The Region continues to discuss possible solutions with the Tribe and is exploring the costs and benefits of modifying the treatment process to reduce the amount of sludge subject to this ARAR (by removing hazardous constituents) or to reduce the uranium levels that trigger low-level radioactive disposal requirements for disposal off site. The Region does not anticipate waiving HSCA requirements. The Region intends to proceed with a proposed plan for off-site disposal, with on-site disposal as a contingency remedy should this approach be determined to be acceptable from a legal standpoint, as well as cost-effective and technically sound. If significant changes from this approach develop following issuance of the proposed plan, they can be addressed in the Record of Decision or, if necessary, an ESD or ROD amendment.*

4. The tribal exposure assumptions in the baseline risk assessment were significantly different from standard EPA exposure assumptions. At the meeting, the future land use was presented as a hunting lodge with some year-round land use (caretaker properties). While the Board is unable to assess the reasonableness of these assumptions, the Board noted that neither the land use nor exposure assumptions were necessary to provide a basis for action at the site, since even a worker exposure scenario would warrant remedial action. The Board recommends that the decision documents provide some discussion of a range of exposures and land use in the uncertainty discussion. In addition, the decision document should also discuss the fact that other scenarios that generally result in less exposure, such as commercial scenarios, would also trigger action. The Board also notes that there may be other factors that should be considered if the hunting lodge/residential use is contemplated (e.g., institutional controls for contaminated ground water, controls for radon, etc.).

Response: *The Region will include in the Record of Decision a more detailed discussion than was provided to the Board indicating site risks based on a Superfund default residential scenario and a simple worker scenario. The Region will also incorporate into the Record of Decision institutional controls to prevent the use of contaminated groundwater outside the waste containment areas. Construction of buildings within waste containment areas will be prohibited, but outside these areas methods of construction to prevent radon buildup will be employed as necessary to assure protection of water treatment system workers. The Region believes that the Tribe should require such construction methods as part of a reservation building code or with other legal mechanisms.*

5. Water treatment costs estimated for the various alternatives were based on the assumption that water treatment volume reduction directly correlated with contaminant load reduction, and reduced recovery times for ground and surface water and sediment. While consolidation of reactive waste to exclude water and air often reduces the volume of acid mine drainage (AMD) formation, reductions in contaminant loading and time to achieve the remedial action objectives (RAOs) are not always directly proportional to AMD volume reduction. Capital costs for Alternative 5a are approximately double those for Alternative 3c largely due to additional waste consolidation in the open pits. The Region indicated that this additional waste consolidation with the increased capital costs has the benefit of reducing long-term operation and maintenance costs. The Board recommends that the decision documents include information on how additional consolidation is expected to result in long-term cost savings.

Response: *The decision document will include a discussion of this topic.*

The Preferred Alternative (modified Alternative 5a) is expected to result in long-term cost savings by reducing the cost of water treatment and sludge disposal. The savings would be achieved by reducing the volumes of water treated and sludge produced. The reductions would be achieved by consolidating the waste in the pits (minimizing the surface area subject to infiltration through reactive material) and providing engineered containment that would limit contact between water and mine waste. This is expected to reduce water volumes and reduce AMD production.

A baseline groundwater model was developed during the RI/FS based on water level data for site wells, measured precipitation and evaporation data, seep and surface water flow measurements, and pit dewatering studies. Following this work, soil cover effects on percolation were evaluated for different waste consolidation scenarios using EPA's HELP model. While there are unavoidable uncertainties given the complexity of a fracture flow system, the HELP model is unlikely to overestimate reductions in percolation. It is estimated that the Preferred Alternative would reduce the volume of water that needs to be treated to 6.5 million gallons per year, a reduction of 92% compared to current conditions, and a reduction of 83% compared to Alternative 3c.

It should be noted that the estimated costs developed for the FS do not include costs for removal of sulfate. If a discharge limit for sulfate lower than current discharge water quality must be met through sulfate removal, the Preferred Alternative would be even

more favorable in terms of long term costs compared to alternatives that would be less effective at reducing the volume of contaminated water.

Changes in the quality of AMD water that must be collected and treated are difficult to predict. For FS purposes, the unit cost to treat the water and the volume of sludge produced per volume of water treated were estimated to be approximately the same under the Preferred Alternative as exist under current conditions. Water currently collected for treatment includes shallow groundwater seeping from waste rock piles, less contaminated water from Pit 4, and surface water, groundwater, and precipitation collected in Pit 3. It is possible that in addition to reduced volumes, concentrations of radionuclides and metals in water will decline as AMD-impacted groundwater enters the pits or moves out of the system. It is also possible that the lack of dilution by Pit 4 water, runoff, and snowmelt will lead, at least temporarily, to higher concentrations of contaminants. Without detailed studies of individual fractures, and fracture wall surface areas and characteristics, these uncertainties can only be resolved by post-construction monitoring or by more intensive action to control AMD. During remedial design, EPA may consider pressure grouting of pit wall fractures to further limit groundwater flow through oxidized fractures connected to the pit wall.

The reduced time to achieve RAOs is not expected to contribute long-term cost savings; rather, the cost estimates are based on the assumption that collection and treatment of contaminated water within the waste management area (WMA) would be needed for the entire 30-year and 140-year cost analysis periods.

The Board's comment notes that reductions in the volume of contaminated water may not result in proportional reductions in contaminant loads in the water (i.e., contaminant concentrations may increase or decrease compared to current conditions). The cost to treat water and the volume of sludge produced are largely driven by the contaminant mass, which is a function of both concentration and volume, rather than one or the other. Thus, if the reduction in contaminant loading under the Preferred Alternative is not as great as the reduction in the volume of contaminated water produced, the full estimated cost reduction would not be realized.

Contaminant loadings that would be treated in the WTP were assessed qualitatively for the purposes of estimating costs. Currently, one of the largest sources of contaminant loading is the existing Backfilled Pits. Under the Preferred Alternative, engineering measures would be implemented to reduce the amount of water that enters the Backfilled Pits and becomes contaminated through interaction with waste materials in the Backfilled Pits. These measures include construction of a low-permeability cover over the Backfilled Pits, which would reduce percolation of surface water into the pits to very low levels, and construction of a cutoff trench, if necessary, to intercept lateral inflow into the pits. It is also likely that the amount of water that seeps into the backfilled pits from bedrock would be reduced after implementation of the preferred alternative. In addition, the Backfilled Pits would be drained, which would reduce the retention time of any water that enters the pits. The reduced retention time would be expected to result in reduced dissolution of contaminants. Water from the backfilled pits is estimated to comprise about 23% of the water that would be treated under the Preferred Alternative.

The remainder of the water is expected to consist primarily of less-contaminated groundwater that would seep into Pits 3 and 4.

Because the estimated volume of water to be treated under the Preferred Alternative is reduced dramatically compared to no action, existing conditions (Alternative 2), and above-grade consolidation (Alternative 3), the total costs of the Preferred Alternative are also less sensitive to the unit cost to treat water and dispose of the sludge. For a worst case scenario where the unit costs to treat water and dispose of sludge are assumed to double compared to existing conditions, the estimated total cost of the Preferred Alternative (present worth of 140 years of O&M at a discount rate of 3.1%) would increase from \$150M to \$159M (6% increase). If the present worth costs are calculated for 30 years of O&M at a discount rate of 7%, the increase would be even less: from \$133M to \$137M (3% increase). The percent cost increase would be greater for alternatives that provide less reduction in water treatment volumes.

6. The Board notes that several conceptual cap/cover designs were developed to mitigate radon flux, water percolation, and radiation exposure rates. The cap thickness of these conceptual designs ranged from 2.7 feet to 10.7 feet and would require significant quantities of borrow material to construct. Considering the limitations in acquiring suitable on-site and/or off-site borrow material for cap installation, the Region should evaluate alternate cap designs (e.g., crushing on-site material, geosynthetic clay liner, etc.) that could minimize the quantity of borrow material required.

Response: *Alternate cover materials sources (e.g., crushed onsite material) and cover designs (e.g., multilayer covers using a geosynthetic clay liner) will be evaluated during remedial design. Preliminary cost data for crushing of on-site rock suggest that this technology may not be cost effective. A rule-of-thumb used by crushing contractors is that the cost doubles for every 50% reduction in particle size. Since a relatively small particle size is needed to provide water storage and to control permeability in an evapo-transpiration cover, use of crushed on-site materials was not evaluated further in the FS. Crushed materials may be more effectively used as cover over a synthetic liner, where storage capacity and permeability are less critical than in an evapo-transpiration cover.*

7. As noted in the comments provided by Dawn Mining Company, the Tribe's opposition to the use of earthen borrow materials from reservation lands for cover construction results in higher remedy costs. When questioned at the meeting, the Tribe indicated that sufficient borrow materials may not be available on the site or on reservation lands to fully construct the waste covers/caps. In view of the potential cost savings, the Board encourages the Region to continue discussions with the Tribe to explore whether at least a portion of the borrow materials could be obtained from reservation lands.

Response: *The Region continues to discuss with the Tribe the possible use of on-reservation soil and will continue to explore this issue as design volumes and characteristics are specified. To be selected over off-reservation materials from a developed borrow source, on-reservation materials will need to be more cost-effective (through some combination of shorter haul distance and lower unit prices) and must be acceptable to both the on-reservation land-owner and the Tribe.*

8. The Board recommends that the Region develop a surface water management plan based on best management practices for the site to include: vegetation type, distribution, erosion control measures, conveyance types, and target evapo-transpiration rates. We believe that such an approach may potentially lead to a reduction in the amount of ground/surface water that would need to be treated. The Region should also include the cost for development of the plan and any associated activities in the decision documents.

Response: *The Region concurs that such a plan is essential to both the stability and the effectiveness of an evapo-transpiration cover and will indicate in the Record of Decision that such a plan will be developed during remedial design. The costs are likely to be a small portion of the overall remedy cost and will be included in the Record of Decision.*

cc: Greg Abrahamson, Chair, Spokane Tribal Business Council
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